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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/541,159	03/31/2000	Tao Kai Lam	(E30-043)-99-202	3415

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10 George Street
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EXAMINER
CHU, KIM KWOK

ART UNIT	PAPER NUMBER
2653	

DATE MAILED: 09/30/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/541,159	LAM ET AL.	
	Examiner	Art Unit	
	Kim-Kwok CHU	2653	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *23 and 26* is/are allowed.

6)☒ Claim(s) *1-6,8-10 and 19-22* is/are rejected.

7)☒ Claim(s) *7,11-18,24,25,27 and 28* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

Specification

1. The disclosure is objected to because of the following informalities:

(a) in the specification, on page 3, line 7, the term "Letters Patent" should be changed to --Patent--;

(b) similarly, in the specification, on page 4, line 1, the term "Letters Patent" should be changed to --Patent--;

(c) in addition, in the specification, on page 4, line 18, the term "Letters Patent" should be changed to --Patent--;

(d) furthermore, in the specification, on page 12, line 8, the term "Letters Patent" should be changed to --Patent--; and

(e) on page 31, the last two lines should be rewritten because there is an objected term "Letters Patent".

Appropriate correction is required.

Claim Objections

2. Claims 6, 24, 25, 27 and 28 are objected to because of the following informalities:

(a) in claim 6, last line, the term "the Ratio Theorem analysis" should be rewritten in a better form because "the Ratio Theorem" is not support in claims 1 or 5;

(b) in claim 24, the labels in the equation should be defined;

(c) in claim 25, the labels in the equation should be defined;

(d) in claim 27, the labels in the equation should be defined; and

(c) in claim 28, the labels in the equation should be defined.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> *(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.*

4. Claims 1-6, 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satoh (U.S. Patent 5,696,646) in view Nakano et al. (U.S. Patent 5,313,617).

Satoh teaches a method of calculating a seek time very similar to that of the present invention. For example, Satoh teaches the following:

(a) as in claim 1, moving a disk head between first and second addresses on a physical disk drive (Fig. 6; step 1; column 2, lines 37-40);

(b) as in claim 1, establishing an array of seek times for seek operations between each segment pair based upon the first and second boundaries (Fig. 7; table 86 stores seek times);

(c) as in claim 1, generating a seek time for disk head movement between the first and second addresses by interpolating the array based upon the first and second addresses (Figs. 4 and 7; step 84 generates seek time by interpolating; column 6, liens 55-58, column 9, lines 25-41);

(d) as in claim 3, the segment boundaries and first and second addresses are independent of each other and wherein the seek time generation uses the first and second addresses as reference locations in each of the logical blocks (Fig. 3; column 5, lines 61-67);

(e) as in claim 5, the seek time generation includes the step of generating a linear interpolation based upon the location of the first and second addresses relative to the segment boundaries (Fig. 5);

(f) as in claim 6. the linear interpolation is based upon ratio analysis (Fig. 5; column 7, lines 6-20, equation 2);

(g) as in claim 8, the physical disk drive includes a data block and the interpolation uses the boundaries of the

data block to obtain a disk seek time for seek operations within the data block (Fig. 5; boundaries of the data block is defined by the addresses);

(h) as in claim 10, assigning a predetermined seek time for each seek operation between two segment boundaries (Fig. 5, the two boundaries are A and B), and

(i) as in claim 10, calculating an intrasegment seek time based upon the predetermined seek times (Fig. 5; interpolation calculation between two addresses).

However, Satoh not teaches the following:

(a) as in claim 1, dividing the disk into a plurality of segments(volumes), each segment having a given size and being defined by first and second boundaries;

(b) as in claim 2, the segment division includes dividing the physical disk drive into segments of equal size; and

(c) as in claim 4, each reference (address) is given relative to a predetermined position on the physical disk drive.

Nakano teaches a data storage system having above features. For example, Nakano teaches the following:

(a) as in claim 1, dividing the disk into a plurality of segments (volumes), each segment having a given size and being defined by first and second boundaries (Fig. 3); and

(b) as in claim 2, the segment division includes dividing the physical disk drive into segments of equal size (Fig. 3);

(c) as in claim 4, each reference (address) is given relative to a predetermined position on the physical disk drive (Fig. 3).

An information storage medium should be partitioned first so that addresses can be created accordingly for data allocation. Although Satoh's disk system does not disclose that the disk are divided into a plurality of volumes each with equal size and reference addresses, however, for the advantage of grouping information, it would have been obvious to one of ordinary skill in the art at the time of invention to divided Satoh's disk into several volumes each with equal size and reference addresses such as Nakano's, because information which is managed under one volume can be searched and addressed more effectively.

5. Claims 9 and 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satoh (U.S. Patent 5,696,646) in view of Nakano et al (U.S. Patent 5,313,617).

Satoh teaches a method for determining the seek time for a physical disk very similar to that of the prevent invention. For example, Satoh teaches the following:

(a) as in claim 9, determining seek times for seek operations between the segments (Fig. 7; table 86 stores seek times),

(b) as in claim 9, accumulating statistics for each access to each logical volume during the time interval (Fig. 7; table 86 stores seek times statistics),

(c) as in clam 9, converting the accumulated statistics into an estimated number of seeks between each pair of logical volumes (Fig. 5, interpolation);

(d) as in claim 9, defining a seek time for each logical volume pair based upon the segment seek times (Figs. 4 and 7; step 84 generates seek time by interpolating; column 6, lines 55-58, column 9, lines 25-41);

(e) as in claim 9, generating a total seek time as the sum of the products, for each logical volume pair, of the seek time for and the estimated number of seeks between each logical volume in the logical volume pair (Fig. 5; interpolation);

(f) as in claim 19, determining the time for a seek operation within a logical volume (Fig. 5; interpolation);

(g) as in claim 20, determination of intra-volume seek time for a logical volume includes defining the boundaries of the logical volume relative to the segment boundaries and determining the seek time between the logical volume boundaries (Fig. 5; interpolation).

(h) as in claim 21, the definition of intra-volume seek time includes interpolating the seek times determined for seek operations between the segments based upon the logical volume boundary locations (Fig. 5, seek time with interpolation calculation);

(i) as in claim 22, the definition of seek time includes the step of linearly interpolating the seek times determined for seek operations between the segments based upon the logical volume boundary locations (Fig. 5, seek time with interpolation calculation).

However, Satoh not teaches the following:

(a) as in claim 9, the disk is configured to store data in a plurality of logical volumes over a time interval;

(b) as in claim 9, dividing the physical disk into a plurality of fixed sized segments independently of the logical volume configuration on the physical disk drive,

Nakano teaches a data storage system having above features. For example, Nakano teaches the following:

(a) as in claim 9, the disk is configured to store data in a plurality of logical volumes over a time interval (Fig. 3);

(b) as in claim 9, dividing the physical disk into a plurality of fixed sized segments independently of the logical volume configuration on the physical disk drive (Fig. 3);

An information storage medium should be partitioned into a plurality of logical volumes with fixed sized segments so that addresses can be created accordingly for data allocation. Although Satoh's disk system does not disclose that the disk are divided into a plurality of volumes with equal size segments, however, for the advantage of grouping information, it would have been obvious to one of ordinary skill in the art at the time of invention to divided Satoh's disk into several volumes with fixed segments such as Nakano's, because information recorded in fixed segments within one individual volume can be searched and addressed more effectively over a time interval.

Allowable Subject Matter

5. Claims 23 and 26 are allowable over prior art.

6. Claims 24, 25, 27 and 28 are objected to because its informalities.

7. Claims 7 and 11-18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is an Examiner's statement of reasons for the indication of allowable subject matter:

As in claim 7, the prior art of record fails to teach or fairly suggest that the physical disk drive includes a plurality of data blocks and the interpolation uses a center location for each data block as the reference location to obtain disk seek times for disk seek operations between different data blocks.

As in claim 11, the prior art of record fails to teach or fairly suggest that the seek time determination includes the step of placing the predetermined seek times in a two-dimensional array with the rows and columns defined by the segment boundaries.

As in claim 12, the prior art of record fails to teach or fairly suggest that the accumulation of statistics includes segregating each access to a logical volume into one of predetermined classes of accesses and weighting the numbers of accesses in each predetermined class.

As in claim 15, the prior art of record fails to teach or fairly suggest that the definition of seek time comprises determining the seek time between a center location of each of the logical volumes in the logical volume pair.

As in claims 23 and 26, the prior art of record fails to teach or fairly suggest that a step of converting the accumulated statistics into an estimated number of seeks between each pair of logical volumes by weighting the numbers of accesses in each of different predetermined classes.

The features indicated above, in combination with the other elements of the claims, are not anticipated by, nor made obvious over, the prior art of record.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Tanaka et al. (5,828,902) is pertinent because Tanaka teaches a disc control device having reduced seek time.

Health et al. (5,570,332) is pertinent because Health

teaches a disc drive having a seek range array.

10. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks Washington, D.C. 20231 Or faxed to:

(703) 872-9314 (for formal communications intended for entry. Or:

(703) 746-6909, (for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2021 Crystal Drive, Arlington. VA., Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-4700.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kim CHU whose telephone number is (703) 305-3032 between 9:30 am to 6:00 pm, Monday to Friday.

PAUL W. HUBER
PRIMARY EXAMINER

KC 9/20/02

Kim-Kwok CHU
Examiner AU2653
September 20, 2002

(703) 305-3032